



Part A Project Description, Organizational, Financial and Legal Information

A-1 Urban Water Conservation Grant Application Cover Sheet

1.	Applicant (Organization or Affiliation)	City of Concord
2.	Project Title	Rain Master ET Controller Irrigation System Installation
3.	Person authorized to sign and submit Proposal	↓
	Name, Title	Edward R. James, City Manager
	Mailing Address	1950 Parkside Drive, MS/01, Concord, CA 94519
	Telephone	(925) 671-3150
	Fax	(925) 798-0636
	E-mail	
4.	Contact person (if different)	↓
	Name, Title	Danea Gemmell, PE, Public Works Engineer
	Mailing Address	1950 Parkside Drive, MS/40, Concord, CA 94519
	Telephone	(925) 671-3402
	Fax	(925) 798-9692
	E-mail	Dgemmell@ci.concord.ca.us
5.	Funds requested (dollar amount)	\$276,750
6.	Applicant funds pledged (local cost share) (dollar amount)	\$25,000 for FCC License
7.	Total project costs (dollar amount)	\$276,750
8.	Estimated annual amount of water to be saved (acre-feet)	67 acre feet
9.	Project life (month/year to month/year)	One year, 10/03 -9/04
10.	State Assembly District where the project is to be conducted	11
11.	State Senate District where the project is to be conducted	7
12.	Congressional District(s) where the project is to be conducted:	7
13.	County where the project is to be conducted	Contra Costa
14.	Do the actions in this application involve physical changes in land use, or potential changes in land use?	
	(a) Yes	
	If yes, complete the land use check list at http://www.calfed.water.ca.gov/adobe/PDF/Questionnaires EC Permits Land Use.pdf and submit with the proposal	
	(b) No	No



A-2 Application Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the application;

The individual signing the form is authorized to submit the application on behalf of the applicant;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the application on behalf of the applicant; and

The applicant will comply with all terms and conditions identified in this Application Package if selected for funding.

Signature

Edward R. James,
City Manager

Name and Title

December 3, 2002

Date



A-3 Application Checklist

Complete this checklist to confirm all sections of this application package have been completed.

Part A:	Project Description, Organizational, Financial and Legal Information
✓	A-1 Urban Water Conservation Grant Application Cover Sheet
✓	A-2 Application Signature Page
✓	A-3 Application Checklist
✓	A-4 Description of project
✓	A-5 Maps
✓	A-6 Statement of work, Schedule
✓	A-7 Agency authority
✓	A-8 Operation and Maintenance (O&M)
✓	A-9 Innovation
Part B:	Engineering and Hydrologic Feasibility (construction projects only)
✓	B-1 Certification statement
✓	B-2 Project reports and previous studies
✓	B-3 Preliminary project plans and specifications
✓	B-4 Construction inspection plan
Part C:	C-1 CEQA/NEPA
✓	C-2 Permits, easements, licenses, acquisitions, and certifications
✓	C-3 Local I and use plans
✓	C-4 State and local statutes and regulations
Part D:	Need for Project and Community Involvement
✓	D-1 Need for project
✓	D-2 Community involvement, support, opposition
Part E:	Water Use Efficiency Improvements and Other Benefits
✓	E-1 Water use efficiency improvements
✓	E-2 Other project benefits
Part F:	Economic Justification, Benefits to Costs Analysis
✓	F-1 Net water savings
✓	F-2 Project budget and budget justification
✓	F-3 Economic efficiency
✓	Benefit/Cost Analysis Tables 1; 2; 3; 4a, 4b, 4c, 4d; and 5

A-4 Description of Project

This project will involve purchase, installation and implementation of a high-tech irrigation management system to improve WUE citywide. The purpose of this application is to secure Grant funds for the purchase and installation of a central irrigation control system application engineering and complete system package, hereafter referred to as an ET Controller System or simply system, from United Green Tech Companies (UGT) including a centralized computer assembly, with software including Rain Master, Advanced Irrigation Management (AIM), and a module to connect to a dedicated weather station which will be included in the Department of Water Resources statewide network of weather stations known as CIMIS (Central Irrigation Management Information System).

We seek funding for the initial phase of this citywide landscape irrigation improvement project which will address 22 sites selected, with the remaining 100+ sites in the City to be addressed subsequently, as priority and funds are identified. The City seeks to achieve a reduction in water use similar to the City of Davis, whole implementation of this system reduced water use by 40%. The City of Concord anticipates that savings will increase exponentially as the system is expanded beyond the initial 22 sites. As system efficiency becomes known in Concord, we believe publication of our success will encourage wider spread use of similar systems for public and private landscapes.

The City and UGT predict measurable reductions in irrigation water use at each location overall totaling 67 acre-feet (AF) per year with associated dollar savings of \$73,610/year. An additional savings of \$23,000 is anticipated from reduced operations and maintenance, not included in the \$73,610. Our analyses assumed a 30% savings in water use and dollar savings. In addition to AF/\$ savings, we anticipate a decrease in long-term landscape maintenance costs per site, resulting from improved WUE.

A cost/benefit analysis has been completed for the 22 sites. Benefits per site varied due to site-specific conditions. However, an overall positive cost/benefit ratio of 1.49 was calculated based on a 30% savings. A seven-year life was assumed for each controller.

An ET Controller System includes solenoid valves at each site linked to a central computer programmed with Rain Master and other software identified above. A dedicated weather station is established to obtain daily data on evapotranspiration, wind and other factors that affect irrigation efficiency. UGT will provide and install the permanent structures (centralized computer system, weather station) and controllers at the initial 22 sites for this phase of the overall project. Staff from the City's Parks & Recreation, Maintenance Services and Information Technology Departments will cooperate with UGT during installation



of the System, and will subsequently be trained to assume operation and maintenance of the equipment.

Subsequent to implementation, the City will monitor each site and prepare the required regular use and fiscal reports, which will identify savings in water use and their associated dollar values. This information will be publicized variously and will be maintained for historical review. (485 words)

A-5 Maps

Presented on the following four pages are maps illustrating the locations of the 22 metered sites considered in this application.

A-6 Statement of Work, Schedule

The City's proposed schedule presented in this section denotes the milestones and timeline for the project. A proposed budget is presented in the Appendix as Table 1, Capital Costs.

This project is eligible for funding under Urban Best Management Practices:

- Item 5, Large landscape (dedicated landscape meters);
- and Potential Best Management Practices:
- Item No. 3, Replacement of existing water using appliances
 - Item No. 6, Distribution system pressure regulation.

This Grant application is for the purchase and installation of a Rain Master ET Controller System to manage irrigation at 22 metered public landscape sites, and ultimately the remainder of metered sites throughout the City. We expect the system to save the City 30% of its current water use and associated expenditure.

ET Controller Systems are relatively new yet proven technology used and demonstrated by the City of Davis and other agencies and facilities. The system has been providing a significant opportunity to cost effectively reduce water use. Costs for expansion of Concord's system to include the remaining metered sites will be proportionately less because many controllers can share the same sole, initially installed centralized computer, weather station and communications facilities.

ET Controller Systems consist of solenoid valves at each site linked to a central computer programmed with software to maximize irrigation efficiency. The system is linked to a weather station as part of the CIMIS weather station network that provides daily data on evapotranspiration, wind and other factors affecting irrigation efficiency.

Anticipated water savings for the 22 metered sites is presented in the Appendix. For these 22 sites and more, we anticipate total water savings at 30% minimum (67AF/year) with associated savings of \$73,610/year, not including the anticipated \$23,000 savings in reduced operations and maintenance costs resulting from a centralized computer making adjustments rather than a manual field adjustment. (~20 minutes per week per man hour times hourly rate.) We believe additional savings will be achieved as the system is expanded beyond these 22 sites.

Method and Procedure

The ET Controller System consists of several components that, when interconnected, result in a water, energy and labor efficient irrigation system. At

each landscape site, one Rain Master satellite controller can accommodate up to 48 solenoid valves, each of which controls groups of sprinkler heads.

The largest of sites may have multiple controllers. Each controller is linked to valves and sensors that allow it to manage all irrigation under its control. Controllers are linked by radio, phone or hard wire to a central control computer. One computer can manage all the controllers for an entire city or district. The central computer is linked to a dedicated weather station on the State's CIMIS system that provides real time evapotranspiration, wind, temperature and other meteorological information.

The central computer is programmed with Rain Master Evolution software, Advanced Irrigation Management (AIM) software, plus the necessary software module to link to the weather station. The Evolution software features a user-friendly graphical interface. The software uses preprogrammed characteristics of the landscape and data from the weather station to determine optimal irrigation needs. The AIM software analyzes the water demand and distributes the water to different valves to distribute irrigation most efficiently.

A major capital cost of the system is the communication component to link these devices. Since only one central computer and one weather station are needed to address all the sites within the City's proposed project, the satellite controllers can be located variable distances from the central computer. A series of antennae and repeaters are required for this system to function. The City has already expended \$25,000 for the necessary FCC license and repeater equipment for the communications component, in anticipation of proceeding with the project.

Expected Outcome

Based on the anticipated availability of Grant funds, installation of the ET Controller system is anticipated for spring of 2004, in time for the 2004 irrigation season. Once Grant approval is received, equipment will be ordered and installation and training scheduled. Our analysis assumed a 30% reduction in water use and associated cost. All Grant funding is expected to be expended within one year of award.

Task List and Schedule

Our schedule presented on the following page identifies tasks and milestones. All affected City departments have committed to this schedule.



Tasks / Milestones	1Q03	2Q03	3Q03	4Q03	1Q04	2Q04	3Q04	4Q04	1Q05	2Q05	3Q05
<i>FCC License Application (complete)</i>											
<i>Notice of Grant Award</i>	✓										
<i>Website location programmed</i>		✓									
Press Release	✓										
Project Life Span 10/03 through 9/04											
<i>Receipt of Funds by City</i>				✓							
Press Release				✓							
<i>Purchase of Equipment</i>				✓							
<i>Weather Station Upgrade</i>											
<i>Installation of Equipment</i>					✓						
<i>Construction Inspection</i>											
<i>System Test Period</i>											
<i>Implementation</i>						✓					
Project Acceptance							✓				
Press Release							✓				
<i>First Quarterly Report</i>								✓			
Press Release								✓			
<i>Second Quarterly Report</i>									✓		
Press Release									✓		
<i>Third Quarterly Report</i>										✓	
Press Release										✓	
<i>Fourth Quarterly Report Annual Report</i>											✓
Press Release											✓
Workshops (min one per year)											

Costs

Our proposed budget is presented in the Appendix as Table 1. We anticipate costs to be a one-time expenditure of \$276,750. Ongoing costs will be no greater than current costs of operating the existing system. In fact, we project savings of \$23,000 in reduced operations and maintenance resulting from computerized adjustments vs. field adjustments by an employee.

A-7 Monitoring and Evaluation

The above schedule will be used to mark progress and keep the project on track. Actual water use and costs by meter will be compared every two or every four months vs. quarterly, as DWR prefers, because CCWD meter readings take place every two months, or six times per year. Results will be compared to historical water use and costs. Historical data has been obtained from our water supplier, Contra Costa Water District. We expect a 30% savings, which will meet our goals and objectives for this project. The results of our monitoring and comparisons will be maintained at a specific location on the City's website and will be updated regularly. The information will be available at all times on our website and will be posted at the City's public bulletin boards and distributed to various recipients as detailed later in this application. Along with statistics, a narrative describing the results will be made for each report.

The specifications and costs for all of the ET Controller System components are included in the budget (Appendix, Table 1). These specifications were developed by UGT in cooperation with the City's affected departmental representatives to ensure that the appropriate equipment is selected and that the equipment meets each site's specific needs. Included in Section B-1 is a certification statement by a licensed civil engineer to verify project feasibility.

A-8 Qualifications of the Applicant and Cooperators

The City of Concord, a City incorporated in 1905 as the Town of Concord, with responsibility for maintaining public landscapes, is qualified to manage projects for the public good, and to enter into a contract with the State for funding.

Purchase, installation and implementation of this system will be conducted under the supervision of Danae Gemmell, PE, Public Works Engineer. Ms. Gemmell's resume is presented in the Appendix. The technical representative for the project is Tony Yarish, District Manager for UGT, whose resume is also presented in the Appendix. Danae Gemmell, PE, will serve as Project Coordinator. Her resume is included in the Appendix. The City has assigned additional staff who will be responsible for working with UGT to install the ET Controller System. These staff will be trained by UGT to subsequently operate

and maintain the ET Controllers. Due to the number of these individuals, their resumes have not been included, but all are qualified landscape professionals.

A-9 Innovation

Technology has evolved around the need for WUE. The State Department of Water Resources has developed a statewide weather station network (California Irrigation Management Information System or CIMIS) of over 100 stations to date, to collect and disseminate to the public, high quality, accurate and reliable irrigation management data including the monitoring of wind, rain, temperature and evapotranspiration (water that evaporates from leaves and soil). UGT has developed the Rain Master ET Controller System to take advantage of the information from CIMIS and help public and private agencies improve WUE at large landscape sites. The ET Controller System is based upon computer-controlled irrigation, a process developed cooperatively between the State of California and the University of California at Davis.

Information from a dedicated weather station is downloaded to a specific computer and then sent to satellites in the field where appropriate daily adjustments in irrigation are automatically made. Adjustments include cancellation of scheduled irrigation when sufficient rainfall occurs. Because the ET Controller System is centrally controlled at a computer and linked by radio signals, staff also has the option to adjust watering manually.

The City of Davis' system was one of the first of its kind in California and has reportedly saved Davis millions of gallons of water a year (40%), as well as landscape maintenance staff time. The City of Concord hopes to follow in Davis' footsteps to save similar percentages of irrigation water per year. We believe that, as this technology and the success is made known to other agencies in California, those agencies will want to adopt similar technology for efficient local irrigation and statewide WUE.

A-10 Agency Authority

1. Concord is located 29 miles east of San Francisco, adjacent to Mt. Diablo. The city covers 30.68 square miles. With a 2000 census count of 121,780 residents, it is the largest city in Contra Costa County. The Town of Concord was incorporated in 1905, and became the City of Concord in January 1948. The City of Concord and the City's official representative, Alex Edward R. James, City Manager has the authority to submit this application and to enter into a funding contract with the State of California. Evidence of Mr. James' authority is included in the City's organization chart located in the Appendix.



2. The City of Concord is the agency legally incorporated as the Town of Concord in 1905 becoming the City of Concord in January 1948, and is thereby authorized to operate as such.
3. The City of Concord is not required to hold an election before entering into a funding contract with the State.
4. The funding agreement between the City of Concord and the State of California will not be subject to review and/or approval by other government agencies. It has been determined to be exempt from CEQA review under Section 15301. No environmental mitigation is necessary.
5. There is no pending litigation that might impact the financial condition of the City, the operation of the water facilities, or the City's ability to complete Phase 1 and the balance of the proposed project.

A-II Operations and Maintenance

The City anticipates a \$23,000 reduction in operations and maintenance costs upon installation of this project as a result of automatic computerized irrigation adjustments vs. adjustments made manually in the field. This savings is in addition to the expected savings of 67 acre feet of water and associated \$73,610 cost.



Part B – Engineering and Hydrologic Feasibility

B-1 Certification Statement

I, Danae Gemmell, Public Works Engineer, and a California registered civil engineer, have reviewed the information presented in support of this application. Based on this information and any other knowledge I have regarding the proposed project, I find that it has been designed, and can be installed and fully implemented to operate for the purpose (WUE) for which it is planned. There is sufficient water supply for the project as no additional water is required. In fact, the project will result in a decrease in water use. The information I have reviewed to document this statement is located in the Appendix.

Danae Gemmell, PE
Original signature and stamp with expiration date

B-2 Project Reports and Previous Studies

Project reports and previous studies for this project include data analyses of projected savings; review of Contra Costa Water District historical water use and associated costs.

B-3 Preliminary Project Plans and Specifications

Project projections and system specifications, prepared by UGT, are located in the Appendix.

B-4 Construction Inspection Plan

Not applicable for this project.

Part C – Plan for Completion of Environmental Documentation and Permitting Requirements

C-1 California Environmental Quality Act and National Environmental Policy Act

This irrigation improvement project is exempt from CEQA under Section 15301 of the CEQA Guidelines, which deals with operation, repair, maintenance or minor alterations of existing public or private structures, facilities, mechanical equipment, or topographic features, involving negligible or no expansion of use beyond that previously existing. The City will file a Notice of Exemption with the County after receipt of Grant funds.

C-2 Permits, Easements, Licenses, Acquisitions, and Certifications

The City of Concord has already obtained a Federal Communications Commission license for the communication component of this project at a cost of \$25,000.

C-3 Local Land Use Plans

Not applicable

C-4 Applicable Legal Requirements

Not applicable

Part D – Need for Project and Community Involvement

The City of Concord currently manages over 150 metered water distribution sites for irrigation of public landscapes. A review of the 22 greatest users indicates their water use rate has potential for significant savings. On-site inspection of selected sites has shown ponding, uneven distribution and other evidence that demonstrates a potential for improvement. Property owners have occasionally reported similar conditions. The current irrigation system is manually operated, similar to home sprinkler systems, and is “dumb”--unable to remotely monitor whether it has rained or if the site is parched, etc. We look forward, by obtaining Grant monies, to create a new “smart” technology for the City of Concord , implementing an irrigation system to mitigate inefficient irrigation of public landscapes.

We seek to model our efforts along the lines of the City of Davis, whose implementation of this system has resulted in successful water savings of 40%. Our goal is not only to save the City water and associated costs, but also to benefit overall State water management, lessening impact on current and future water supplies. We look forward to encouraging other agencies to improve their WUE similarly.

The City’s current source of water comes to us via Contra Costa Water District (CCWD). CCWD obtains water from the CALFED Los Vaqueros Reservoir/Delta in Contra Costa County. The U.S. Bureau of Reclamation and the California Department of Water Resources, both CALFED agencies, have partnered with CCWD to complete studies examining the feasibility of expanding the reservoir to improve water quality and water supply reliability. CALFED’s Bay Delta Program is a long-term plan to fix the San Francisco Bay / Sacramento-San Joaquin Delta ecosystem while meeting the needs of those who depend on the Delta for water. We are unaware of substitute supplies.

If the City does not proceed to employ this new state-of-the-art technology for improved water use at public landscapes, we will continue to inefficiently use water and incur the associated costs under the current (old) state-of-the-art for this process. As water supplies statewide are being closely monitored, Concord wishes to keep pace with the Department of Water Resources’ guidelines for WUE. If the project goes forward, we believe the environment will benefit not only at the local level for the beautification of Concord, but statewide for the City’s contribution to overall water conservation.

Concord’s Water Supply

CCWD owns and operates the existing Los Vaqueros Reservoir in Contra Costa County and seeks to improve water quality for CCWD customers, provide stored

water for emergencies, and improve the Delta habitat. Water is pumped into the reservoir from the Delta during high water flows, when the water is generally low in salts and other contaminants and when impacts to Delta fisheries are low. (High salt levels and contaminants and occasional regulatory restrictions often impair water quality in the Delta. When the flow of fresh water into the Delta declines, drinking water quality degrades.) CCWD then blends water from the reservoir with Delta supplies during periods of lower quality. The reservoir serves as an important emergency storage facility that can be used if CCWD is not able to divert water from the Delta.

The CALFED Bay-Delta Program is a consortium of state and federal agencies committed to restoring the Bay-Delta environment and improving the management of California's water. The Program developed a long-term comprehensive plan for restoring the Bay-Delta ecosystem and improving water supply reliability, water quality and levee integrity. The CALFED Record of Decision cites the need for additional surface water storage as an important activity to improve water quality and water supply reliability and identifies five potential locations for expanding surface water storage, including the Los Vaqueros Reservoir in Contra Costa County.

The City of Concord understands the need to address demand management, an integral part of our Urban Water Management Plan. Installation of this irrigation water management system including ET Controllers is consistent with these plans. We therefore believe that reducing demand on our water supply, to whatever degree, contributes overall to quality drinking water in the Contra Costa Water District territory. We believe this project is consistent with goals and objectives of the DWR Water Use Efficiency Office and other water management and resource management plans. Implementation of demand management is sensible providing it is cost-effective.

D-2 Outreach, Community Involvement, Support, Opposition

As mentioned earlier, our goal is to be as successful as the City of Davis in reducing water use/costs by at least 30%. The City has identified a plan for public outreach to make the success of this system well known.

Our first contact will be an announcement (Press Release) of Grant award along with a description of the project and its goals and objectives, to the media, local entities including adjacent cities, adjacent counties, the Contra Costa Water District, property owners and community based organizations.

This announcement and subsequent reports (every two to every four months, as DWR prefers) for at least one year will be made by Press Release to the media, mailings, posting of the relevant documents at the City's public bulletin boards, and posting on the City's Website. We will also invite eye witness accounts of

specific site conditions. Each press release will compare old and new statistics to document progress. We expect to contact 50-100 organizations whose members will be encouraged to “spread the word” reaching uncountable numbers of people.

As interest demands, we will offer workshops to agencies, organizations and individuals to explain the system and potential benefits.

City staff in the City’s Parks & Recreation, Maintenance and Information Technology Departments will receive training relevant to the new system because they will assume operations and maintenance after installation by UGT.

Social and economic benefits from the project include improved site-specific water distribution enhancing city landscapes, improving the appearance of City street medians, parks and other landscaped public areas. Play fields will have better water distribution, improving appearance and use, eliminating ponding of water in certain locations, and unsatisfactory runoff in others. These benefits will make such recreational areas more enjoyable for public use. The savings in unnecessary water distribution will result in economic benefits to the City in terms of dollars saved.

An additional benefit is the City's contribution to decreasing water demand in cooperation with the CALFED Bay-Delta program for the improvement of water quality. We are aware of no opposition to the project.

Outreach, Community Involvement and Acceptance

As mentioned above, the City will issue press releases to the media, which will be distributed to property owners, adjacent cities/counties, Contra Costa Water District, CALFED, Bureau of Reclamation, DWR and community groups (1) informing them about the project and purpose, (2) inviting them to participate in workshops discussing the project and the technology, and (3) encouraging them to consider installation of a similar system. Findings will be published regularly beginning with the first full CCWD billing period of implementation.

ET Controllers will be installed throughout the City, and we will encourage citizen awareness that this system will improve their public parks and recreation space as well as street medians, etc. The City will monitor results and notify the public of the savings, encouraging anyone responsible for large private landscapes to consider this system. Individual staff members involved in the project have committed to encourage peers at other agencies to consider the system.

Although a small tribelet of Chupcan (Bay Miwok) Indians were the first inhabitants of the Diablo Valley, from 1772 and forward Spanish explorers/settlers inhabited and owned City property. Thus there are no tribal properties within the City limits to consider.

Concord will also provide training opportunities for City staff from Parks & Recreation, Maintenance, and Information Technology to operate and maintain the system. This system installation does not create new jobs; however, it provides a higher level of efficiency in managing WUE. Staff will benefit from the training by acquiring exposure to new technology, acquiring state-of-the-art irrigation management information, increasing their personal buy-in, improving their self-esteem and employability, and making them more valuable employees.

Part E Water Use Efficiency Improvements and Other Benefits

E-1 Water Use Efficiency Improvements

Described in detail elsewhere, WUE will be achieved at the various public landscapes by reducing unnecessary and/or inefficient landscape watering.

E-2 Other Project Benefits

Reductions in water use will result in cost savings to the City. Improved water use at landscape sites will reduce long-term maintenance. Computerized automatic adjustments vs. manual field adjustments will contribute to further savings projected at \$23,000 annually. Concord's success will be widely publicized to foster statewide WUE, encouraging others to adopt similar state-of-the-art irrigation management.

Part F Economic Justification: Benefits to Costs

This section illustrates that the City of Concord's irrigation management project benefits are equal to or greater than project costs with a cost/benefit ratio of 1.49. The period of analysis (one year of history, seven years of performance) shows that the project will pay for itself within seven years.

The purchase, installation and implementation of this central irrigation control system application engineering and complete system package is anticipated to cost \$276,750 as shown in the Appendix, Table 1. Based on UGT estimates we have reviewed to date for the initial sites identified, more sites have been identified for improvements. This additional work will incur minimal planning and engineering costs of ~\$20,000.

Benefits and Costs

Budget Breakdown and Justification

- a. There will be no land purchase or easements. All equipment will be installed on City property.
- b. There will be minimal planning/design/engineering costs. Half of the sites were considered as a first phase and were reviewed, specified and priced out by UGT working with City staff. The remaining 11 sites were subsequently identified based on water usage and planning costs will be for these eleven sites.
- c. Installation costs can be categorized into two areas. (1) Labor costs by UGT to install the equipment. (2) Concord costs to prepare the existing system to accept the ET Controllers, including trenching for cable and conduit, and installation of control valves and sensors.
- d. There will be no cost for structures, as the ET Controller equipment is designed to withstand the elements in their enclosure structures.
- e. Documentation is presented in the Appendix to provide detail of the equipment purchases that constitute the ET Controller system.
- f. No environmental mitigation is necessary. This project is exempt from CEQA under Section 15301 of the CEQA Guidelines, which deals with operation, repair, maintenance or minor alterations of existing public or private structures, facilities, mechanical equipment, or topographic features, involving negligible or no expansion of use beyond that previously existing.

- g. There will be minimal Grant funding for construction/administration overhead. The City of Concord, at its own expense, will provide adequate staffing to ensure that the program is implemented as specified in this Grant. Concord will ensure that administrative duties are performed after the Grant is awarded, including ongoing monitoring and reporting of results.
- h. The only license fee involved in this project is the Federal Communications Commissions license for radio communications. The City of Concord has already expended \$25,000 for this license, in anticipation of proceeding with the project.
- i. There are minimal contingency costs identified since the cost of equipment is known.

Another economic benefit is the potential cost savings for long-term landscape maintenance labor. Other public agencies that have installed similar ET Controller equipment have determined a potential for considerable labor savings. This has not been quantified in this Grant application; however, we have qualitatively evaluated the potential for measurable maintenance labor savings in addition to the \$23,000 savings operations and maintenance quoted elsewhere (computerized irrigation adjustments vs. employee field adjustments. Documentation of information will be disseminated along with quantifiable water savings, as specific information evolves.

Cost Sharing

There will be no cost sharing among departmental participants. There will be a cost for operating this equipment on an ongoing basis, but that cost is expected to be equal to or less than current costs for operating existing equipment. We estimate savings of \$23,000 in operations and maintenance with ET controller systems resulting from automated computerized irrigation adjustments vs. manual field adjustments.

There are also the minor costs (virtually all of which Concord will bear) for managing the process of monitoring meter readings / water use and the comparisons to historical data, dissemination of information as described earlier, and the advocacy process including workshops.

Benefit Summary and Breakdown



Site-specific outcomes and benefits will differ based on variable factors. Overall, this project will reflect direct water reductions resulting in anticipated savings of 30%. Projected water and cost savings are shown in the Appendix, Table 4.

Assessment of Costs and Benefits

Costs assume that all work will be completed in fiscal year 2003-04. We anticipate award of funding in the fall of 2003. We anticipate installation of equipment during spring of 2004 in time for the 2004 irrigation season. The value of water saved will be dependent upon water consumption.

In accordance with CALFED guidelines, the life of an ET Controller System has been set at seven years in order to demonstrate a cost benefit ratio equal to or greater than 1.0. Our ratio is 1.49. A summary of cost/benefit analyses is presented in the Appendix tables. The City plans to reinvest savings into additional ET controller equipment for other sites throughout the City. These water savings will and will continue to contribute to meeting Concord and CALFED WUE goals.

The following spreadsheet illustrates our Capital Cost Budget Summary.

F-1 Net Water Savings

Net water savings under this project will be accomplished by reducing water losses to the atmosphere through evaporation and /or transpiration, thereby qualifying for funding under this Grant. It appears that this project is justifiable even without Grant funding. The back-up data used for evaluation of past water use has been one years' history of water use and associated costs provided by Contra Costa Water District. Table 4 demonstrates current water use vs. the anticipated savings of 67acre feet per year and \$73,610 per year. We have obtained seven years' history of water use and associated costs from CCWD. This data (~75-100 sheets) is available for review upon request.

F-2 Project Budget and Budget Justification

Project costs will include the purchase, installation and implementation of the system as described elsewhere for the purpose of saving water and associated costs. Grant funds will not be used for any other purpose.

Project Budget

Table 1 illustrates our projected budget of \$276,750. Annual costs for administration, operations, maintenance and other costs are shown in Table 2. Not captured in the \$73,610 savings anticipated are additional savings of \$23,000 from reduced operations and maintenance costs resulting from computerized vs. manual field adjustments to irrigation sites.

F-3 Economic Efficiency

Quantifiable direct economic benefits to the City of Concord relative to the cost of the project include the dollar savings as a direct result of reducing water use. Additional quantifiable economic benefits will likely accrue from reduced services required long-term for City Maintenance staff (avoided cost valuation). Additional savings have also been quantified to be \$23,000 per year in avoided costs as a direct result of a computerized automatic system of adjustments to irrigation sites vs. the manual adjustments historically made by a field engineer at the site.

Since the City purchases its water from CCWD, the water conserved will reduce impact on the volume purchased and reduce demand on the Los Vaqueros Reservoir / Delta. Future City growth may or may not require augmentation of current water supplies purchased to meet future demand for landscape irrigation.

Analysis Assumptions

- **Period of Analysis**

The period of analysis for this project involving the purchase and installation of the ET Controller System (water conserving equipment or devices) is seven years--a one-year history of consumption and a projected lifespan for equipment of seven years.

- **Inflation and Escalation**

We have assumed zero future inflation and escalation of costs for ease of analysis, as allowed by the application.

We expect the initial phase of this project (the 22 greatest users at metered sites) will produce 30% reduction in water use. It is possible that, as the project is expanded to the additional metered sites (lesser users), the overall savings may be sufficient to fund the additional controllers required to bring all metered sites (balance of existing and future) under the umbrella of improved WUE with no additional allocation of "new" funds.

- **Discount Rate**

Benefit and costs have been discounted at 6% to reflect the value of money over time, as used by DWR.

- **Dollar Value Base Year**

All benefits and costs are expressed in current year dollars, indicating the year, as required.

- **Multiple-Funded Projects**

The economic analysis has been conducted for the entire project, regardless of funding sources. All projects costs (capital and O&M) have been included, even though the City has requested Grant funds for only part of the overall project (22 sites for the initial phase vs. 151 sites for the whole project).

- **Project Costs (Tables 1, 2, 3)**

Project costs include capital (construction/installation) and annual operation and maintenance (O&M) costs. While some project costs are included in the economic evaluation, all components for the total project (151 meters) have been included in the project budget, as required.

- **Avoided Cost of Current Supply Source (Table 4a)**

There are no alternative projects being considered as this time.

- **Water Supply Vendibility (Table 4c)**

Because the City is not a water vendor, this item is not a factor in our application.

The avoided cost of current supply sources and the alternative costs of future supply sources are illustrated in Table 4a and 4b. There are no other costs or benefits that have not already been addressed or captured in the tables.

Appendix: Benefit / Cost Analysis Tables

Table 1: Capital Costs

Table 2: Annual Operations and Maintenance Costs

Table 3: Total Annual Costs

Table 4a: Water Supply Benefits: Avoided Cost of Current Supply Sources

Table 4b: Water Supply benefits: Alternative Cost of Future Supply Sources

Table 4c: Water Supply Benefits: Water Supplier Revenue (Vendibility)

Table 4d: Total Water Supply Benefits

Table 5: Benefit / Cost Ratio

Table 6: Capital Recovery Factor

Resumes

Edward R. James, City Manager
City of Concord Organization Chart
Danea Gemmell, PE, Public Works Engineer, Project

Coordinator

Tony Yarish, Technical Representative, United Green Tech
Companies

United Green Tech documents

System Specifications
UGT Projections (letter from Tony Yarish)
CCWD Use and Cost Tables for Seven Years (upon request)

Support Documents

UGT Cost Estimates
CCWD Use and Cost Tables for Seven Years
(~75 pages available upon request)

Applicant: City of Concord

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table 1: Capital Costs

	Capital Cost Category (a)	Cost (b)	Contingency Percent (c)	Contingency \$ (d) (bxc)	Subtotal (e) (b+d)
(a)	Land Purchase/Easement			0	0
(b)	Planning/Design/Engineering	20,000	5.00%	1,000	21,000
(c)	Materials/Installation	190,500	10.00%	19,050	209,550
(d)	Structures			0	0
(e)	Equipment Purchases/Rentals			0	0
(f)	Environmental Mitigation/Enhancement			0	0
(g)	Construction/Administration/Overhead	44,000	5.00%	2,200	46,200
(h)	Project Legal/License Fees			0	0
(i)	Other		10.00%	0	0
(j)	Total (1) (a + ... + i)				276,750
(k)	Capital Recovery Factor: Use Table 6				0.1791
(l)	Annual Capital Costs (j x k)				49,566

(1) Costs must match Project Budget prepared in Section F-2.

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Table 2: Annual Operations and Maintenance Costs

Administration (a)	Operations (b)	Maintenance (c)	Other (d)	Total (e)
0	0	0	0	0

Table 3: Total Annual Costs

Annual Capital Costs (1) (a)	Annual O&M Costs (2) (b)	Total Annual Costs (c) (a+b)
49,566	0	49,566

(1) From Table 1, line (l)

(2) From Table 2, column (e)

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Table 4: Water Supply Benefits
(2002 Dollars)

Net water savings (acre-feet/year) 67

4a. Avoided Costs of Current Supply Sources

Sources of Supply (a)	Cost of Water (\$/AF) (b)	Annual Displaced Water Supply (AF) (c)	Annual Avoided Costs (\$) (d) (b x c)
Contra Costa Water District	\$1,100	67	73700
			0
			0
			0
			0
Total			73700

4b. Alternative Costs of Future Supply Sources

Future Supply Sources (a)	Total Capital Costs (\$) (b)	Capital Recovery Factor (1) (c)	Annual Capital Costs (\$) (d) (bxc)	Annual O&M Costs (\$) (e)	Total Annual Costs (\$) (f) (d+e)
			0		0
			0		0
			0		0
			0		0
			0		0
Total					0

(1) Use number from Capital Recovery Factor Table 6

4c. Water Supplier Revenue (Vendability)

Parties Purchasing Project Supplies (a)	Amount of Water to be Sold (AF) (b)	Selling Price (\$/AF) (c)	Expected Frequency of Sales (1) (%) (d)	Expected Selling Price (\$/AF) (e) (cxd)	"Option" Fee (2) (\$/AF) (f)	Total Selling Price (\$/AF) (g) (e+f)	Annual Expected Water Sale Revenue (\$) (h) (b x g)
				0		0	0
				0		0	0
				0		0	0
				0		0	0
				0		0	0
Total							0

(1) During the analysis period, what percentage of years are water sales expected to occur?

For example, if water will only be sold half of the years, enter 50% (0.5).

(2) "Option" fees are paid by a contracting agency to a selling agency to maintain the right of the contracting agency to buy water whenever needed. Although the water may not be purchased every year, the fee is usually paid every year.

Table 4d. Total Water Supply Benefits

(a) Annual Avoided Costs of Current Supply Sources from 4a, column (d)	73,700
(b) Annual Avoided Costs of Alternative Future Supply Sources from 4b, column (f)	0
(c) Annual Expected Water Sale Revenue from 4c, column (h)	0
(d) Total Net Annual Water Supply Benefit (\$) (a+b+c)	73,700

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Table 5: Benefit/Cost Ratio

Project Benefits (\$)(1)	73,700
Project Costs (\$)(2)	49,566
Benefit/Cost Ratio	1.49

(1) From Table 4d, row (d): Total Annual Water Supply Benefits

(2) From Table 3. column (c) : Total Annual Costs

Table 6: Capital Recovery Table

Life of Project (in years)	Capital Recovery Factor
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872
21	0.0850
22	0.0830
23	0.0813
24	0.0797
25	0.0782
26	0.0769
27	0.0757
28	0.0746
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669
40	0.0665
41	0.0661
42	0.0657
43	0.0653
44	0.0650
45	0.0647
46	0.0644
47	0.0641
48	0.0639
49	0.0637
50	0.0634